Issue 31
April 2020

Utah Valley Amateur Radio Club

The UVARC Shack

Challenging times

Keith McQueen KB7M unraveled for us the mysteries of what goes into making a repeater tick, in a spell-binding February meeting presentation. He brought hardware for a

repeater station, complete with cavities, circulator, power supply, and controller, and describes how each piece contributes to the setup. Keith showed a lot of great photos of the club repeaters and other repeater shacks, and related propagation maps, which explained some of the shadows we experience with the 146.760, 146.780, and 145.250 repeaters.

In this issue of the *UVARC Shack*

Highlights from three club meetings, including our first all-online meeting. A letter to club members from the club leadership.

Brass Tacks explains the importance of bandwidth.

Dear Annette tells how to get cigarette smoke out of your purchase, the significance of 13.8 volts, and laying a sideways ground rod. Discussion in *Hot Tips* on non-emergency frequencies. Simple *DIY* for a coaxial cable continuity tester aid.

Please send your ideas, stories, questions, gripes, and photos to ***uvarcshack@gmail.com***

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Message

From the club leadership

Fellow club members:

As you well understand, we're living in challenging times. Four years ago, it would've been difficult to foresee the events we now witness first-hand. Even though we have a lot of great things to look forward to, the next few months might try our patience, our willingness, and our resolve.

Many of us have been barred from regular social outlets, have become worried or anxious from the daily stream of news, or have even lost employment. We're wisely refraining from gathering, and confining ourselves to our homes when possible. Under these circumstances, it's fairly easy to turn inward by self-pity, personal obstacles, or just plain cabin fever.

But new challenges bring with them new opportunities for growth, for understanding, and for service. At times, these also require new or renewed focus. For many of us, amateur radio is more than a fun hobby, but also a way to give back to our community and serve our families by fulfilling one facet of preparedness. There are many new hams who still have questions. There are many experienced hams who need your kind and non-judgmental words of encouragement, even for things unrelated to radio.

There is nothing more important in the universe than your family, and nothing should stand in your way of making them your top priority, be they near or far. Once you're comfortable that the needs and wants of your family are met, please keep them in mind as you then reach out to others. Both your family and your ham community need your reassuring attitude, your cheerful demeanor, and your smiling face. Make a goal each day to say only positive things, difficult as that might be.

Through all of this, our commitment to you remains, to serve you and encourage you. We invite all of you to join with us in helping to make good on that commitment, because we can't do it all without you.

Thank you

The club presidency,

Noji Ratzlaff KNØJI

Chad Buttars WE7CB

Caryn Alarcon KG7UUR

Wendy Shoop KW3NDY

Trevor Holyoak AG7GX

Club meetings

Recap

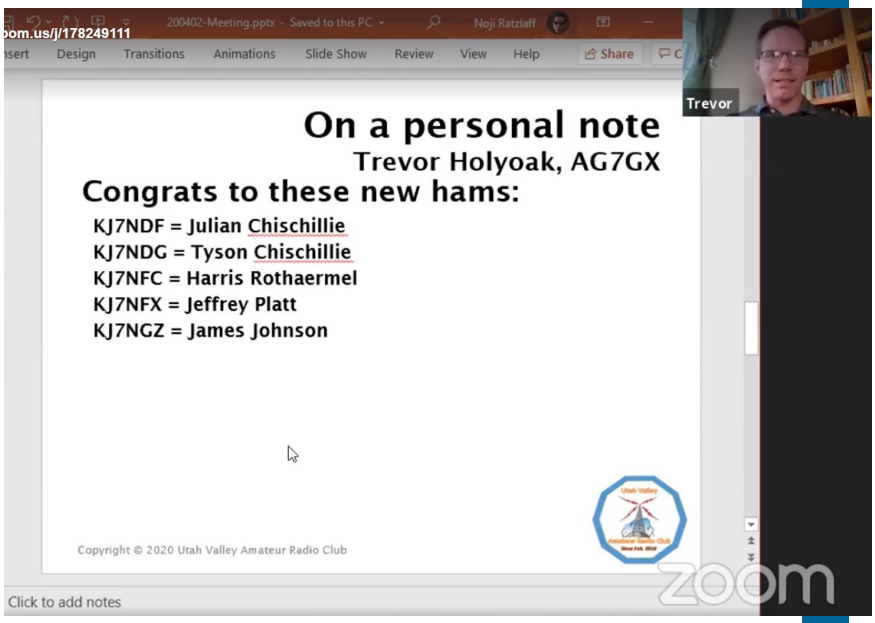
February, March, and April 2020 club meetings

Many thanks to Joe Costello WH6QV, our roaming photographer, and to Trevor Holyoak AG7GX, our videographer and live-streamer.

Spotlight on the Taylorsville Hamnet, with Troy Buchanan as president, alongside its founder

Mickey Applebaum KE7NZA takes home the gold, a complete HF station (Icom IC-735 and mating PSU and ATU) door prize

Dave Mamanakis KD7GR, Ogden Amateur Radio Club president, taught us about mobile radio installations in March



April featured our first-ever fully online meeting, set up by Richard Bateman

Events

Upcoming happenings

Utah Valley Hamfest 2020

UTAH VALLEY HAMFEST
& DISASTER COMMUNICATION 2020

We acknowledge the many of you who have helped us get this hamfest off the ground. You've sacrificed many tireless hours to help make this a reality, and you have a club full of very grateful members who want to express the same.

As you know, we've had to cancel the hamfest, due to the Pandemic, and we're sorry we couldn't fulfill our dream of making it happen this year. On the other hand, we're proud to say that we believe our decision to cancel our event will likely help save lives and contribute to more quickly bringing this health crisis chapter to an end.

We're already starting to discuss resurrecting the hamfest for next year, but are far from releasing any information about it, such as date and location, until our nation is well past this global challenge, and most of us are back on our feet again. So, stay tuned for details as we learn of them.

Utah Valley Hamfest Leadership

UVARC Field Day 2020

At the writing of this newsletter, UVARC is still planning to participate in ***Field Day***, Sat June 27 through Sun June 28, perhaps the largest amateur radio event of the year. Obviously, plans can change quickly, and we'll do our best to keep you informed as we get closer to the date.

Assuming we're cleared for takeoff, we'll gather at the Co-Op Creek site just off Forest Road 451, near Strawberry Reservoir once again. Here's a link to the map.

UVARC will set up three main stations, and include digital, CW, and SSB, plus a GOTA (get-on-the-air) station, satellite station, and at least two VHF stations.

We'll be hosting a potluck dinner Saturday at 6 pm, with a sign-up sheet to be published later.

If you're new to HF, this might be a good chance to get on the HF air for the first time, and experience first-hand what it's like to communicate with others across the nation without going through a repeater. One step in long-distance emergency communication prep.

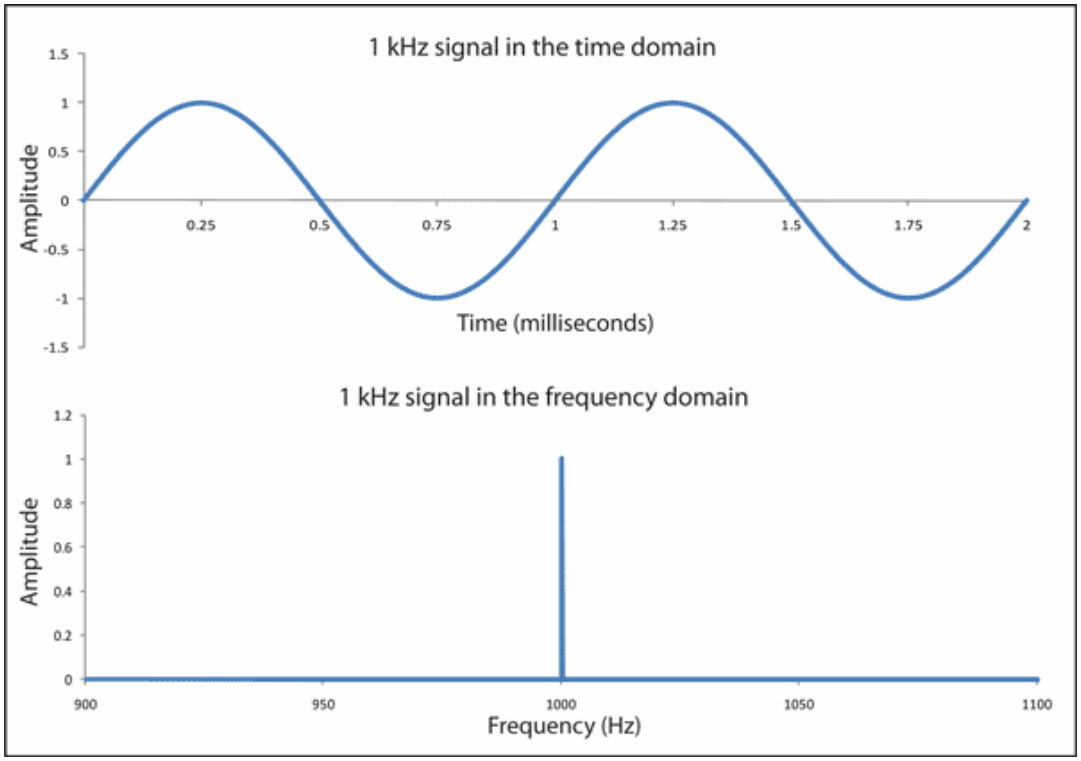
Brass Tacks

An in-depth look at a radio-related topic

Bandwidth

Every so often, the subject of *bandwidth* seems to come up, and judging by the way most hams dismiss its significance, it seems to me that the topic deserves a little mention. Essentially, bandwidth is the ***difference between two frequencies*** that surround a spectrum of concern. A *spectrum* is a (continuous or non-continuous) range of frequencies, for the purposes of this discussion.

Furthermore, to discuss this topic a little more intelligently, it might be better to refer to spectrum and bandwidth in the *frequency domain*. When we visualize sine waves, we tend to think of a graph that shows the amplitude of the wave, as it rises and falls with time, in what we call the *time domain*. The following graphs illustrate both, representing the same signal:



The translation from the time domain to the frequency domain is displayed easily by a *spectrum analyzer*, or mathematically by a *Fourier Transform*, which we won't get into here. As you can see, because a simple sine wave has only a single frequency, it shows up on the analyzer as occupying a single spot, and therefore its bandwidth is

higher frequency – lower frequency = 0 Hz

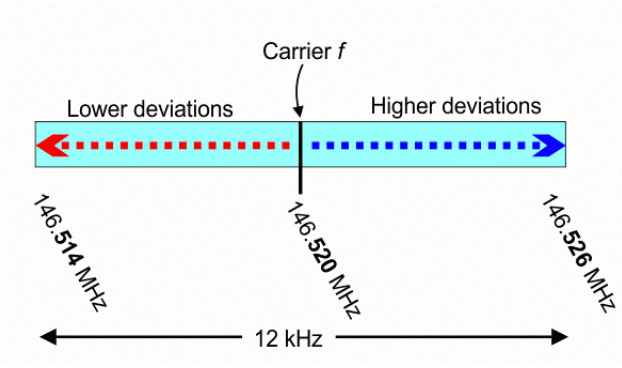
This simple sine wave cannot convey much information, except that a) it does or doesn't exist at that frequency, and b) what its amplitude is. And this very point alone can be the beginning of some amount of misunderstanding of the concept of bandwidth.

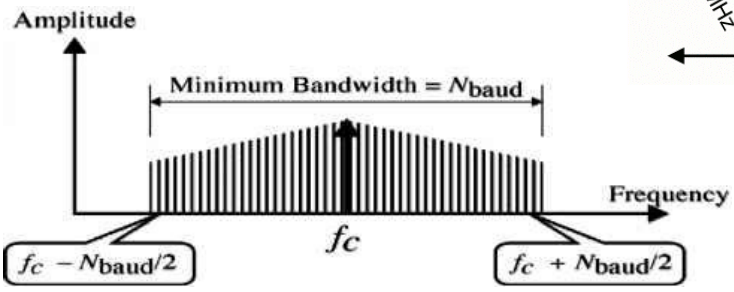
Brass Tacks

continued

Modulated signal bandwidth

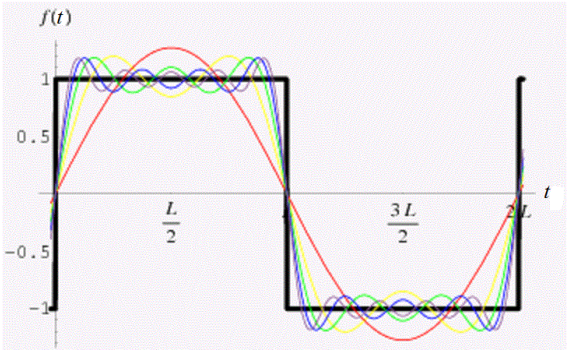
In FM (frequency modulation), the bandwidth is defined by the *deviation*, which relates directly to the *amplitude* (strength) of the modulating signal. In AM (amplitude modulation), the bandwidth is defined by the *modulation*, which relates to the *pitch* (frequency) of the modulating signal (voice or music, for example). It stands to reason that not much information can be conveyed by zero bandwidth, because it takes one or more frequencies to communicate, over and above the carrier signal. The modulated signal that requires perhaps the smallest bandwidth, CW (continuous wave, for transmitting Morse code), is achieved by an on-and-off signal, but still requires around 150 Hz.





ASK signal bandwidth

In digital modes such as ASK (amplitude shift keying) and FSK (frequency shift keying), the bandwidth is defined by *bitrate*. Therefore, the higher the bitrate, the more bandwidth is required to transmit digital information.



A square wave, which defines a string of bits in an ASK signal, in fact, takes up an infinite bandwidth, as seen by the Fourier Series for a square wave.

So, digital signals require a huge amount of bandwidth to preserve the square wave, but our radio equipment will filter out much of the *harmonics* that exceed a specific amplitude threshold. Furthermore, our transmissions can legally be made outside the amateur bands, so long as they're under a specific amplitude level, depending on the frequency. For example, say I'm transmitting SSB on 14.252 MHz, and my PEP (peak envelope power) is 80 watts at the output of my transceiver. It's possible for my transmission to produce a third harmonic at 14.252 MHz x 3 = 42.756 MHz, which is outside the amateur radio service bands. If the harmonic is less than –43 dB of the PEP (80 watts –43 dB = 80 watts ÷ 20,000 = 4 mW), then my transmitted harmonic is legal, according to the rules, even though it's outside the amateur range.

So, when a sine wave is modified in any way, except by amplitude, its bandwidth also changes. The conclusion is that *transmitted information takes up bandwidth*.

Brass Tacks

continued

Repeater bandwidth

In the US, most analog FM repeaters accept and transmit signals that are restricted to specific, set bandwidths. 2-meter repeaters are generally set to one of two bandwidths, which are often referred to as *Wide* and *Narrow*. Their nominal values are typically 15 kHz and 6 kHz, respectively, for transmit, and 28 kHz and 22 kHz, respectively, for receive. In Utah, a Wide transmission is defined as ±5 kHz deviation, resulting in 15 kHz to 18 kHz bandwidth, and a Narrow transmission is defined as ±2.5 kHz deviation, resulting in 12 kHz to 15 kHz bandwidth.

Because most amateur radio 2-meter and 70-cm repeaters in the US use Wide bandwidth for analog FM, your amateur radio should also be set for Wide. This corresponds to the "25 kHz" or "Wide" setting on your handheld and mobile radios. The "12.5 kHz" setting, therefore, corresponds to the "Narrow" setting in the same radios. There are some analog repeater owners across the US who are converting their repeaters to Narrow band, but in Utah, they are all Wide band. Digital repeaters ("digipeaters") typically use Narrow bandwidth (12.5 kHz) for some modes, such as DMR or D-STAR.

At any rate, if you attempt to transmit an analog FM signal with a bandwidth that's different from the receiver bandwidth of the repeater or other station, your demodulated signal will likely be heard as a distorted or garbled sound, resembling that of Charlie Brown's teacher or Donald Duck. Furthermore, if you attempt to transmit a Narrow analog signal to a receiver set to accept a Wide FM analog signal, your audio will likely be heard at about ¼ the normal audio level or lower. So, when you hear somebody who's able to hold the repeater, but speaking at a very low audio level, he might simply have his bandwidth setting on Narrow by mistake.

Antenna bandwidth

The bandwidth of an antenna is the frequency range within which it can effectively receive or transmit a signal. Typically, we consider "effective" to mean the range of frequencies for which the antenna presents an SWR of 2.0:1 or lower, known as the *SWR bandwidth*. If the antenna SWR is too high for the desired frequency range, we often use a tuner on HF, or a passive matching (gamma match, beta match, delta match, hairpin match, etc.) system on VHF to lower the SWR, and reduce the loss due to feed line attenuation. In either case, the SWR bandwidth is determined by the entire *antenna system* (antenna, tuner / match, feed line, connectors, etc.) within the target frequency range. Furthermore, the antenna system can include objects that it *couples* with, such as metal gutters, swing sets, and anything nearby that can conduct electrical energy, thereby also affecting its bandwidth.

There are material and other characteristics that can affect antenna bandwidth. Typically, the thinner the active elements (the conductive parts that actually emit the signal), the lower the bandwidth. Many find themselves having to choose between copper, aluminum, galvanized steel, and stainless steel for antenna element material, and the two metals will differ more in *velocity factor* than they will in bandwidth.

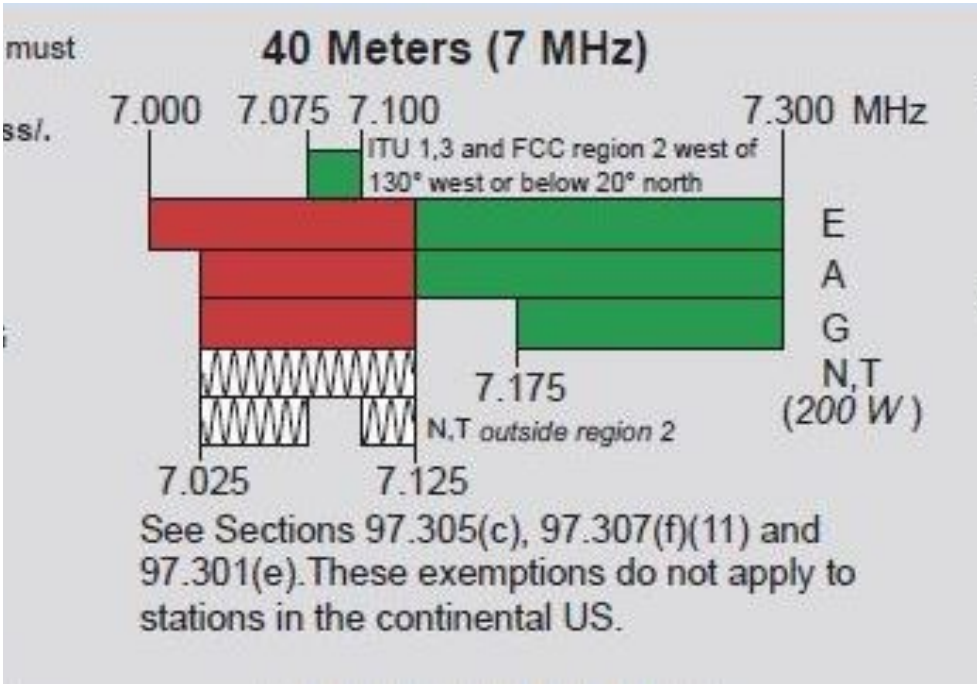
Brass Tacks

continued

Allocation bandwidth

The FCC has defined bands of frequencies for use by operators holding each license class and operation mode. We say that these bands have been *allocated* according to the operating privileges and modes defined by each license class. In a sense, each segment of continuous frequencies constitutes a sub-band, and the difference between the highest and lowest frequency of each sub-band defines its bandwidth. But when discussing the entire bandwidth of a nominal band, we often refer to the entire range, which is the difference between the highest and lowest frequency in the entire band, and therefore includes all the sub-bands.

For example, amateurs have privileges in the frequency range surrounding 7.200 MHz, whose wavelength is approximately 300 / 7.2 = 41.6 meters. The rounded number "40" is a *nominal* value (meaning *by name only*), so although none of the wavelengths within the amateur 40 Meter band are actually 40 meters (300 / 40 = 7.5 MHz), we simply refer to the band by the name *40 Meters*.



Within the 40 Meter band are sub-bands that are defined by license privilege and mode. The frequency range from 7.175 MHz to 7.300 MHz, for example, is allocated for operation only for *phone* (voice), *image* (analog photos and video), and *CW* (Morse code) operation by those holding a General class or higher license. Some sub-bands are further restricted per location. For example, amateurs operating in the segment from 7.075 MHz to 7.100 MHz are permitted if they transmit from ITU Region 1, Region 3, or Region 2 west of 130° W longitude or south of 20° N latitude. For us Americans, that means only if we're in Hawaii or Alaska.

Brass Tacks

continued

Transceiver bandwidth

It probably goes without saying, that you should acquire a transceiver that's capable of both receiving and transmitting your desired bands. Many hams purchase an "HF" rig that can transmit not only HF signals, but 6 Meters as well. Some go as far as purchasing what's known as a *shack-in-a-box*, or a transceiver that can transmit at least HF, 6 Meters, 2 Meters, and 70 cm signals.

Another bandwidth concern to consider when purchasing an HF transceiver is *coverage*. Most modern rigs support what's known as *general coverage*, meaning it can receive all the frequencies in the HF band, whether they're amateur or not, something that's important to SWLers (shortwave listeners). So, one more thing to watch for, if general coverage is important to you.

Amplifier bandwidth

Like any other amateur equipment, amplifiers operate most effectively within a specific frequency range. Typically, HF amplifiers support the entire 1.8 MHz to 30.0 MHz spectrum, but some do not support operation under 3.5 MHz, so close attention to their specifications is advised, as it is for any piece of amateur hardware.

Audio bandwidth

Those of us who enjoy high-fidelity sound understand the human limitation of hearing between 20 Hz and 20 kHz. However, in an effort to conserve spectrum space, our amateur radio equipment that captures, modulates, transmits, receives, and demodulates audio uses much less than that to effectively perform communication. In fact, the typical audio range of most amateur equipment is designed to cover little more than 300 Hz to 3000 Hz, with perhaps the microphone often being the component of largest bandwidth.

Most repeaters require a (CTCSS) tone from your radio, to activate its re-transmit function. This tone is a simple sine wave between 67 Hz and 255 Hz, and is called a *sub-audible* tone, even though it's within the human audio range, because it (along with any signal below 300 Hz) is filtered out in the receiver during demodulation, sparing the listener from hearing it.

Instrumentation bandwidth

When considering the purchase or use of equipment, bandwidth must often be taken into account, especially to determine whether your tool will support the frequency range required. For example I purchased a RigExpert AA-170 antenna analyzer to aid in my DIY (do-it-yourself) adventures, because I felt it provided the greatest benefit for my investment. The analyzer supports all HF bands, 6 Meters, and 2 Meters, but not 1.25 Meters (220 MHz), so when I needed to build a match for a 220 MHz antenna, I had no way of testing it until I could borrow somebody else's analyzer.

Other test instruments, for which frequency and bandwidth support are important, include a watt (power) meter, SWR meter, VNA (vector network analyzer), logic probe, spectrum analyzer, and maybe even an oscilloscope. More than once I've known hams who have purchased an inexpensive watt meter, only to find later that their instruments don't support the frequency range they actually needed.

Brass Tacks

continued

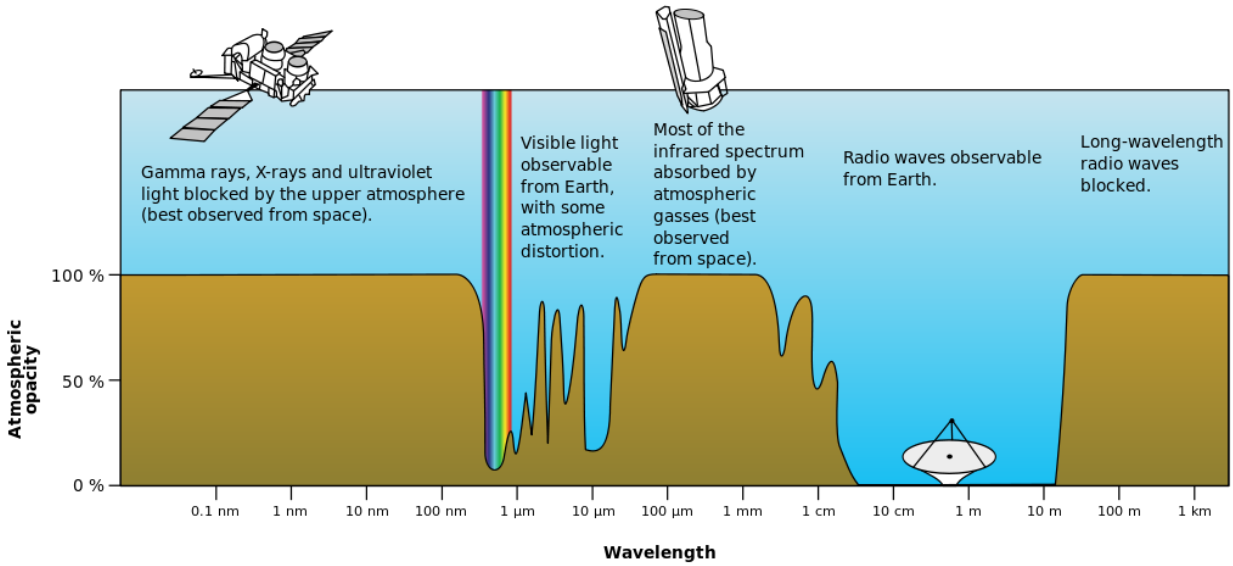
Bandwidth of transmission line components

In specifications of coax (coaxial cable) and associated connectors, even those seemingly RF-friendly items operate effectively only within specific frequency limits, mostly defined by attenuation for each model. For example, RG-58 starts exhibiting 10 dB and greater loss over 500 MHz, whereas LMR-400 doesn't exhibit 10 dB loss until 3000 MHz (3 GHz).

Coax connectors realize similar bandwidth limitations, such that PL-259 / SO-239 connectors work well for HF and VHF applications, but N-type and SMA connectors fare better (lower insertion loss) at UHF frequencies.

Atmospheric bandwidth

In spite of how clear the sky appears on sunny days and starry nights, even the atmosphere has bandwidth. And because our atmosphere is made of a variety of layers, its bandwidth is not confined to a single band, but multiple bands, due to *electromagnetic opacity*.



Summary

Bandwidth is the difference between the highest and lowest frequency in a set of one or more continuous frequency ranges. An often overlooked parameter, bandwidth is an important consideration for radio operation, instrumentation function, and equipment purchases, and if ignored, can spell failure to perform. For amateur radio concerns, just about every piece of hardware that can conduct electrical or RF (radio frequency) energy, and even the air, can perform their intended function only within specifically designed frequency ranges.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

Dear Annette

What's on your mind? Serious, humorous, technical, and thoughtful answers to your deepest, (mostly) ham-related questions.

Dear Annette:

I recently purchased my first used HF rig online from an SK smoker. I took my chances on it because it was such an amazing deal. But now my whole family can smell the effects of the cigarette smoke, and I can't seem to get it out, even after cleaning it with alcohol, ammonia, and 409. Do you have any advice on how to get the cigarette smell out of the case, knobs, buttons, and microphone cord for my rig?

Andrew in Blanding

Dear Andrew:

Until you've experienced it yourself, it's difficult to believe how permanently tobacco smoke can reside in your equipment. I've discovered that a 50/50 solution of Dawn™ and water, with a piece of terry cloth works best for me, especially on the rubber parts. Be sure not to rub hard on the silkscreen lettering, and never use paper towels, which can scratch your display and finish.

Dear Annette:

Why do many mobile and base ham radios require 13.8 VDC? Where does this "13.8" value originate?

Foxer in Eagle Mountain

Dear Foxer:

At one time, most amateur radio transceiver manufacturers designed their units with a power supply included, to convert 120 VAC to the internal DC voltages required. Of course, this had two disadvantages: the power supply made the rigs quite heavy, and the AC requirement prevented them from being very portable. But *portability* to most means drawing power from 12 VDC lead-acid automobile batteries, historically containing six 2.3 VDC lead-acid cells, which at full charge added to 13.8 VDC.

Dear Annette:

I know how important it is to install a ground rod, to connect my antenna ground to. But after pounding and bending two of them in five different spots, I'm about to give up, because my yard is sitting on bedrock or something. Would it be horrible if I simply buried my ground rod sideways under eight inches of topsoil, instead of vertically driving it in?

Jack in Orem

Dear Jack:

Sometimes, all we can do is all we can do. Yes, you can bury your ground rod sideways, and that will work to provide a path for static and nearby lightning discharge to Earth ground, but it won't be ideal, because it lacks depth. Still, what you're describing resembles what the military used to call a *Ufer ground*, in which they poured concrete over the rod, because they were unable to dig down very far, and the concrete became their ground.

Dear Annette:

I've read online that I need to cut my coax cable at half-wavelength intervals, to make my SWR as low as I can. Any truth to that?

Larry in Orem

Dear Larry:

You've encountered one of the great controversies in amateur radio, with expert and prominent RF engineers on both sides of the argument. But since you asked *me*, let me give you my take, based on *my* education and field work. ***You do not need to cut your coax to multiple fractions of wavelengths, to minimize SWR or optimize anything else.***

Got a question for Dear Annette*? Email it to* ***uvarcshack@gmail.com*** *and include your town name. Sorry, no guarantees.*

The Amateur in You, Part 1

What have you been pondering?

Getting involved with emergency communication

One of the reasons you got your ham radio license is for preparedness, because you probably heard that this form of communication is more reliable and less expensive off-grid than others. But now that you've come this far, your goal is to not only help yourself, but others in your community, and maybe even your state. So, is there some organized way for you to put your new-found skills to work, and be of help in your community? Will those in charge actually feel they can confidently call upon *you* to provide essential emergency services?

Yes

It's indeed possible for us amateurs to get called upon as *volunteer* emergency services communicators. However, there is an *organized* way for you to get involved and help.

1. ARES

Sign up and become certified by your local ARES group, which in most cases is at the county level. They are likely working with your AUXCOMM team, if you even have one (most places do not yet), to help train you in procedure and protocol, and *will let you know when and where to help* in an official capacity, if needed.

2. RACES

Sign up and become accredited with your state's RACES organization, which in most cases is at the state level. They are also likely working with your AUXCOMM team, again, if you have one. The RACES folks tend to leave much of the training up to the AUXCOMM folks, but if you're new to emergency communication, you should start with your local ARES team.

3. Area

Get involved in your local (religious, community, area) net, and volunteer to help out as a communicator. Their leaders will likely keep a list of volunteers, along with their skill levels, and *call upon your help as they see the need*.

4. Family

You are free to help out your own family and neighbors without any sort of training, position, or direction, as long as you're a) representing yourself (not any organization), and b) your self-deployment activities don't interfere with emergency coordination efforts being done by other groups.

5. Volunteer

Volunteer your services in the ARES and local (religious, community, area) groups by offering to run their nets, present a training topic, or host a simulated exercise (a *tabletop exercise*, not a mock disaster). If you don't volunteer your time and services, the organization leaders might not realize that you want to help out at all.

Related to volunteering, stay up-to-date. Get on the ARES mailing list, and make sure you're getting their updates. Keep informed on upcoming events, such as meetings, training, simulated exercises, callouts, and more. Find out how to increase your expertise by advancing your certification level.

The Amateur in You, Part 2

What have you been pondering?

The wide world of HF

As you might recall from when you took the Technician exam, amateur radio operators have privileges in three major super-bands: ***HF*** (roughly 3 MHz to 30 MHz), ***VHF*** (roughly 30 MHz to 300 MHz), and ***UHF*** (roughly 300 MHz to 3000 MHz, or 3 GHz). There are others, but these are the three on which we tend to focus our attention.

Well, you've heard people talking about HF, and what it's capable of, and now you feel like you're ready to jump into it. So, where do you start?

General class license

You can only do so much with a Technician class license, such as SSB on a 200 kHz section of 10 Meters, plus CW on a couple of other bands. But you have no desire to learn Morse code, so start with HamStudy, master the General material, then take the exam.

Transceiver

The first piece of equipment to acquire might be an HF transceiver, but there are a few things to keep in mind when selecting one. Here are some recommendations when looking for one:

1. It should output at least **100 watts** on SSB
2. Acquiring a used one will save you big bucks, but if you don't know your seller personally, purchase your first rig **new**
3. Being able to transmit on 6 Meters, 2 Meters, and / or 70 cm is nice, but **not really necessary**
4. A built-in **autotuner**, waterfall, or sound card is a plus, but not a deal-breaker, and many newer rigs have these features
5. A desk mic is not necessary; a **hand mic** will do just fine
6. Purchase from the Big Three: **Yaesu**, **Icom**, or **Kenwood**; Alinco is great too, but there won't be many nearby who can support you; for that matter, just stick with Yaesu or Icom for your first new rig

Antenna

Your first HF antenna should be a **dipole** (regular, fan, or OCF) for contacting all over the US, or a **vertical** (Hustler, hy-gain, Cushcraft) for contacting overseas, or **end-fed** (MFJ, MyAntennas, Ultimax) for a mixture. Stay clear of doublets (G5RV, ZS6BKW, Zepp), loops, and L-types, not because they don't work, but because they require a little experience and expertise to get working well.

Power supply

Purchase one of these three 30 amp PSUs:

1. MFJ MFJ-4320MVP
2. Powerwerx SS-30DV
3. LandR RLPS30M

Transmission line

Use RG-8X for your coax, which is inexpensive and low-enough loss for HF work. Be sure to create an RF choke out of 12 feet of it, right near your antenna feed point, to reduce RF being sent back into your shack.

CQ

Now, fire up your new toy, and get on the air. Start with SSB, then work your way into other modes, such as FT8 or PSK31 later, if you'd like. Sit with a mentor and listen for tips. Join a net. Call out ***CQ*** and see who's out there. Get hooked on contests.

And you thought 2 Meters was fun. It was.

Hot Tips

Good info for the new ham, and old stuff to refresh your memory

Monitoring frequencies during a nearby incident

Once in a while an incident occurs, but in another county, or is not large enough to label it a local emergency or to disrupt cell phone operation. These can include an earthquake, chemical spill, a large storm, and out-of-area flood. Although they might not affect you very much right away, or at your current location, the disaster potential might be real enough to worry you, especially if a loved one lives in the affected region.

Essentially, you're in a **non-life-threatening** situation. Everybody near you seems alright, they haven't lost consciousness, have minor injuries or aren't bleeding much, they seem emotionally stable, and there's simply no need to call an ambulance. At times like that, we tend to want information, like how big the nearby incident is, how you should respond, if at all, where you should go, and how to best reassure others.

Similar to what happened during the last earthquake, because we were not in a truly emergent situation, yet somewhat involved in a relatively minor way, there was not really a need to activate emergency protocols; just had to collect a few reports. As a result, the emergency frequencies we had mentioned in previous trainings were fairly irrelevant to the situation. So, what *can* or *should* we listen to?

Tune to local, most popular repeater frequencies, plus a locally accessible repeater system. Often, when an incident occurs, a previously designated operator will start a net going on one of them, and ask for people from all over to check in and report conditions at their locations. In spite of the mis-information potential, they might just give you the most information from those who are experiencing the incident first-hand.

When the recent earthquake hit, one person assumed Net Control on the Intertie, started a net, and asked for reports from all over Utah. Many people checked in, reported the conditions at their locations, and gradually helped paint us a large mental map of what was or was not happening where, as a result of the earthquake. It was a good and quick way to get a little peace-of-mind, when the broadcast news agencies could not say anything more than what was officially released to them, which was sparse at first.

Here are some recommended frequencies:

Utah County

146.760- repeater

147.120+ (100.0 Hz) repeater

(Intermountain Intertie)

Salt Lake County

146.620- repeater

147.120+ (100.0 Hz) repeater

(Intermountain Intertie)

Emergency broadcast radio channels

102.7 FM (KSL-FM)

1160 AM (KSL-AM)

Police, sheriff, fire, and EMS (emergency medical services) frequencies, which include, but are not limited to, the following:

851.600 MHz : Utah Public Safety (all)

154.860 MHz : N Utah County Sheriff

156.135 MHz : S Utah County Sheriff

155.235 MHz : Search and Rescue

Search out and find the same or similar kinds of frequencies where you live, including popular repeaters and statewide repeater systems, if you have them. *Please remember to not interrupt an emergency communication unless it's truly necessary.*

DIY

Worthwhile projects you can build on your own

Coax continuity tester

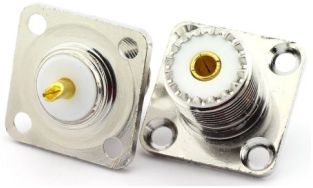
Have you ever suspected that your coax had a break in its center conductor or that your coax shield and center might be shorted? Couple that with the fact that the leads of your ohmmeter were not long enough to reach between one end of your coax and the other end outside on your roof. Well, here's an easy solution, but it's still going to require your ohmmeter.

It's nothing more than a 100-ohm resistor soldered between the center pin and the flange of an SO-239 bulkhead. The idea is to install it on one end of your coax, and measure the resistance at the other end. If both the shield and the center conductor of your coax are continuous, the ohmmeter should read about 100 ohms, give or take.

This works for most common coax types, such as RG-58, RG-8X, LMR-400, RG-213, LMR-240, RG-8, and others. And it works for coax lengths up to 300 feet. What it won't tell you is which side (the center or the shield) is broken, if the resistance reads infinite. And it won't tell you where the short is, if it reads zero ohms.

Parts list

One SO-239 bulkhead connector
One 100-ohm 1/4-watt 1% resistor



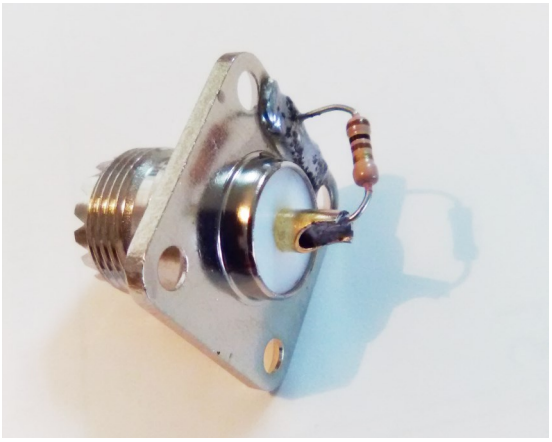
SO-239 bulkhead

Construction

Attach the PL-259 connector of one end of any coaxial cable onto the SO-239 bulkhead. This provides for both a heat sink and a center stabilizer, in case you get the Teflon dielectric too hot. Cut both ends of the 100-ohm resistor to leave about ¾" of wire on each end. Solder one wire of the 100-ohm resistor to the inside cup of the center pin of the SO-239 bulkhead, and allow it to cool.

PL-259 attached

Using a hot (60 watts or greater) soldering iron, solder the other wire of the 100-ohm resistor to the flange of the SO-239 bulkhead. The flange is a terrific heat sink, and will require lots of heat, so this step must be done as hotly and as quickly as possible. Furthermore, what this joint will need is a lot of solder *flux*, rather than just solder, to get the solder to bond with the flange.



The finished product

Conclusion

Alright, this was a rather simple project for a DIY column in the newsletter. Ideally, I could provide beeping circuitry to replace the ohmmeter. But I've used this so often, I figured I might as well share one of my simple, secret tools, to help make my amateur life a bit easier.

Noji Ratzlaff, KNØJI (kn0ji@arrl.net)

Living in the Past

Historical perspective

Young women hams to the rescue

On 29 November 2007, the National Weather Service issued its first-ever hurricane-force wind warning for the Oregon coast. By 02 December, the second of three storm fronts had brought wind gusts up to 137 mph, and up to 14 inches of snow onto the Washington southwest coast. Named the *Great Coastal Gale of 2007*, the storm was blamed for widespread record flooding and 18 deaths, one of the (perhaps three) largest storms to ever strike that area in recorded history.

An obscure LDS branch

Back up eight months. President Norman Hansen of the (LDS) Centralia Washington Stake had received some new preparedness pamphlets from the Church, which he distributed to his wards and neighboring stakes right away. Brian Felt, President of the Long Beach Branch (in the Rainier Oregon Stake), took the pamphlets seriously, and challenged the youth in his branch to obtain their amateur radio licenses, among other preparedness measures.

Many of the Young Women and two of their leaders took the counsel to heart and became licensed. They formed a branch net, and practiced their fun, new craft, not truly believing their hobby would actually turn into anything useful.

When the storm hit, men, both young and old, were called out to help with the cleanup effort, clearing roadways, removing heavy debris, and nailing tarps on roofs all over the county. The Relief Society operated the Distribution Center, giving aid to hundreds of families. The National Guard made it in to help, but much of the County emergency services could not.

Under the leadership of President Felt and the Young Women leaders, the Young Women set up a net and a schedule of operation to monitor ham radio traffic and relay messages to the County EOC (Emergency Operations Center) for days, all on simplex. Hundreds of families received assistance because of the coordination, and many loved ones made contact, as a result.

Speaking later about lessons learned in the aftermath of the storm, President Felt said, *Women and Young Women are incredible resources, capable of far more than traditional women's roles, when a disaster strikes.*

Side of Bacon

A little ham humor

When in Quarantine
PEOPLE who are in quarantine are not isolated if they have a Bell Telephone.
The Bell Service brings cheer and encouragement to the sick, and is of value in countless other ways.
Friends, whether close at hand or far away, can be easily reached, because Bell Service is universal service.
The Bell Telephone Company of Missouri
Commercial Department 1101 Locust Street

Newspaper ad during the 1918 Pandemic

System to Provide Emergency Communications.

WASHINGTON, May 25 (AP).—The Signal Corps of the army is organizing an amateur radio system to provide additional channels of communication during a national disaster.

Amateur radio operators throughout the United States will be asked to cooperate with the Signal Corps through the new system. In the building of a net work of communications which can be used to augment or replace land lines which have been seriously damaged or destroyed by floods, fire, tornadoes or earthquakes.

Those who become a part of the proposed system will cooperate with military commanders and relief organizations assisting in the emergency. Heads of the Signal Corps branches in the corps areas throughout the United States will be responsible for the units in their districts.

The so-called net system has been adopted by the corps in organizing the project. By means of this system, every operator in the "net" will know what his duties are in time of disaster.

The nets are centred in strategic points in each geographical area of each State, in the State capitals, in corps area headquarters, and in Washington. The amateur net control station is at Fort Monmouth, N. J.

New York Times, 1929

For Your Insight

Information you could use

Club meeting format

Here's the usual agenda for club meetings, at the Orem City Council Chamber Room, 56 N State St:

Talk-in frequency on the club repeaters

6:30 pm : Eyeball QSO

socialize / put faces with call signs

radio programmers available to help you

6:45 pm : Call the meeting to order

meeting lineup (agenda)

announcements / nets / awards / calendar

7:00 pm : Discussion / breakout session

discussions typically involve everybody

breakouts split into separate groups

7:45 pm : Door prizes

7:55 pm : Dismiss and disassemble

8:00 pm : *Club QSY* to a local eatery

Something you'd like to see at the meetings?

Monthly meeting help

We're grateful for the volunteers who help with various tasks that make our club night just that much more friendly and useful to everybody. Monthly, we need help with

programming radios (thanks, Loren / Ralph / Mickey!)

taking photos or videos during the meeting

operating the talk-in radio

setting up tables and chairs (thanks, Heath!)

Lynx

Websites for your education and leisure

Training items and topics for nets

Ham Radio Nets

Radio programming

76ers Group and UVARC Group pages

Utah Ham Radio Exam Schedule

Send your input to ***uvarcshack@gmail.com***

Questions of the Month

Test your knowledge (answers next page)

G5B14 : What is the output PEP from a transmitter if an oscilloscope measures 500 volts peak-to-peak across a 50 ohm resistive load connected to the transmitter output?

A. 8.75 watts

B. 625 watts

C. 2500 watts

D. 5000 watts

E4AØ7 : Which of the following is an advantage of using an antenna analyzer compared to an SWR bridge to measure antenna SWR?

A. Antenna analyzers automatically tune your antenna for resonance

B. Antenna analyzers do not need an external RF source

C. Antenna analyzers display a time-varying representation of the modulation envelope

D. All of these choices are correct

Calendar

What's happening
(times are Mountain Time)

Utah County Ham Exam Sessions

BYU J. Reuben Clark Law School building

Sign up at HamStudy.org/sessions

Wed May 20, 7:00 to 8:45 pm — maybe
Wed June 17, 7:00 to 8:45 pm
Wed July 15, 7:00 to 8:45 pm
Wed August 19, 7:00 to 8:45 pm
Wed September 16, 7:00 to 8:45 pm
Sat September 19, 2:30 to 5:00 pm
Wed October 21, 7:00 to 8:45 pm
Sat October 24, 2:30 to 5:00 pm

Provo One-day Technician Courses*

Third Saturday Monthly at 8:00 am
BYU Law School Bldg, First Floor
* *except May, June, July, and August*

2020 Orem Ham Radio Courses

General : Tue 21, 28 Jul, 04, 11 Aug
Technician : Tue 22, 29 Sep, 06, 13 Oct

Club Meeting Calendar (6:30 pm)

Orem Council Chambers, 56 N State St

May 7	June 4
July 17*	August 6
September 3	October 1
November 5	December 3*
January 7	February 4

** Actually a potluck at 25 N Main St, Lindon*

Regular Nets

Jackson Hole Net, Mon 8:00 pm, 146.76
UVARC Ladies' Net, Tue 7:00 pm, 146.78
DMR Utah Net, Wed 6:00 pm, TG 3149, CC 1
UARC 76'ers, Wed 7:00 pm, 146.76
UVARC New Ham Net, Thu 7:00 pm, 146.78
CERT Net, 2nd & 4th Thu 8:00 pm, 146.78
Utah County 6 meters, Fri 8:00 pm, 50.14
Sultans of Simplex, Sat 7:00 pm, 447.825
Family History Net, Sat 8:00 pm, 146.78
UVARC Family Net, Sun 3:30 pm, 146.78
See a larger list of nets at noji.com/nets

Upcoming Contests

ARRL Rookie Roundup
Noon to 6 pm Sun Apr 19

7th Call Area QSO Party (7QP)
7 am Sat May 2 to 1 am Sun May 3

Canceled Utah Valley Hamfest QSO Party
11 am to 7 pm Sat May 9

Canceled Hamvention QSO Party
6 am to 6 pm Sat May 16

See a larger list at contestcalendar.com

Answers to the Questions of the Month

G5B14 : **B** (625 watts) [The "peak-to-peak" assumes an unmodulated carrier, for which the PEP derives from the RMS value, which derives from the carrier peak value, so PEP = V_{rms}^2/R = $(V_p/\sqrt{2})^2/R$ = $((500\ V_{P\text{-}P} \div 2)/\sqrt{2})^2/(50\ \text{ohms})$ = 625 watts

E4AØ7 : **B** (Antenna analyzers do not need an external RF source)

Vendors

For your convenience

Pockrus Joystick J-pole

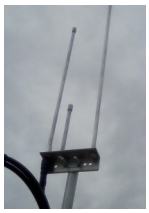
$25, open-stub aluminum half-wave, dual-band J-pole antenna

$35, 6-meter dipole, $20 for the 220 MHz (1.25 m) antenna

by Carl Pockrus, WE7OMG (email myjpoles@gmail.com to purchase)

Half-wave performance, solid construction, weather-proof, low wind-load

Probably the best-performing outdoor antenna you can get for the price



Super-Elastic Signal Stick

$20, vertical quarter-wave flexible antenna

by Richard Bateman, KD7BBC, of *SignalStuff* (and maker of *HamStudy*)

Super-performing antenna for your HT (handhold transceiver)

Visit SignalStuff and select SMA-Male, SMA-Female, or BNC

Ham Radio Podcasts v1.50

by Trevor Holyoak, AG7GX (email android@holyoak.com)

Stream podcasts (such as *100 Watts and a Wire*, *Amateur Radio Newsline*, *ARRL Audio News*, etc.) or download for later listening

For Android 4.1 and up (ad-free available for purchase)

Club Logo and Call Sign Embroidering

Want your call sign or name (or both!) embroidered on your shirt, your hoodie, your duffle? Or how about a club patch with your call sign?

by Glenna Gardner, WE7SEW (glenna0354@gmail.com or text 801-592-2503)

Call sign or name = $5, Both = $8, UVARC patch = $5, Patch with call = $9

Portable Aluminum J-pole

$49, sectioned, open-stub aluminum half-wave, dual-band J-pole antenna

by Stan, KJ7BDV and Kent, N7EKF (email skantenna@yahoo.com for info or call 801-372-7260)

Complete antenna breaks down into a compact 2″ x 6″ x 12″ package weighing only 3 lbs, perfect for backpacking and portable work where you really need a good 2-meter antenna

HamBadgers

Amateur radio name badges and other products

$10, official UVARC ham radio name badge with the club logo

Visit Ham Badgers and select Ham Radio Clubs > Utah Valley Amateur Radio Club

Email Eric Palmatier at hambadgers@gmail.com or call 919-249-8704

Where everybody knows your call sign

Utah Valley Amateur Radio Club
PO Box 1288

K7UVA
Phone/Text: 801-368-1865
Email: k7uva@arrl.net

Repeaters: 146.780–, 100.0
448.200–, 100.0 224.560–, 100.0
145.250-, 100.0 448.225-, 100.0
Newsletter input?
Email uvarcshack@gmail.com
Need help?
Email uvarcelmer@gmail.com

[See all our newsletters on uvarc.club]

We are the *Utah Valley Amateur Radio Club*, a 501(c)(3) non-profit (EIN 81-360-6416) Utah corporation that was organized in an obscure Orem fire station on 02-05-2016 to provide amateur radio enthusiasts in Utah County and surrounding areas a way to gather and discuss all things ham. Our primary purposes are to provide a local amateur radio resource, help new hams in their new-found adventures, and to give more experienced hams a reason to share their wealth of knowledge and wisdom in a friendly atmosphere of fellowship. We're an ARRL Affiliate and work in cooperation with the Utah VHF Society, but are not subsidiary to them, to UARC, the 76ers, UCARES, RACES, the SCATeam, or any other organization, although many of our members and leaders might also belong to the same.

This newsletter is copyrighted and published by the Utah Valley Amateur Radio Club, and its purpose is to convey the tone and temperament of the club, to inform and entertain its members, and to entice the rest. To join, go to uvarc.club/join, then sign up at www.facebook.com/groups/uvarc/ to stay informed. For more information about our club or about amateur (ham) radio in general, please email or text or call us.

More than just a club, we invite you to become part of a great ham radio movement in Utah Valley

Our fearless leadership

Presidency

President..... Noji Ratzlaff
Vice President..... Chad Buttars
Secretary.....Caryn Alarcon
Activities..... Wendy Shoop
Technology.....Trevor Holyoak

Board of Directors

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Carl Pockrus, WE7OMG
Aubrey Gum, K7GUM
Jeff McGrath, N1SC
Jody Dollar, K7BUX
Jeremy Giovannoni, K7TEH
Brad Kirk, AF7FP
Alma Perry, W1ZGY
Loren Chandler, WB1KE
James Brown, W7JHB

Club Sponsor

Heath Stevenson
Orem City Emergency Manager

From all of us to you, 73

As a birthday present to her dad, Dani Reed (Noji's daughter) conspired with Steve Whitehead and Dave Becar (not pictured), and became KJ7MOJ